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LISTS OF SPECIES

Checklist of Insects Associated with *Salvinia minima* Baker in Louisiana, USA

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ABSTRACT: This study presents a list of adult insects (excluding Diptera and Lepidoptera) collected from an infestation of an invasive aquatic weed, common salvinia (*Salvinia minima* Baker), in southern Louisiana, USA. Insects were sampled from May – November of 2009 and 2010 using floating pitfall traps. A total of 7,933 specimens were collected, representing seven orders, 70 families, and 235 species. Species of note include three currently undescribed species of Coleoptera, one previously undescribed braconid wasp, two new state records of Curculionidae, a new state generic record for the family Limnichidae, and a new record for the United States.

INTRODUCTION

Aquatic macrophytes contribute to the structure and function of wetlands in a variety of ways, including positively affecting diversity among associated groups and providing shelter from predation (Brown 1998, Olson *et al.* 1994, Batzer 1998). Many species of invertebrates show distinct preferences for aquatic plants based on their physical structure (Dvorak and Best 1982, Cyr and Downing 1988, Dvorak 1996). However, invasive plants threaten wetland community structure and integrity by forming monotypic stands, changing available habitat, altering diversity, and modifying food webs (Zedler and Kercher 2004). As more non-native plants such as *Salvinia* species invade waterways, the ecosystem functions that macrophytes provide are likely to change (Luken and Thieret 1997).

Older studies examining insects associated with *Salvinia* species focused on identifying potential biological control agents for *S. molesta* Mitchell by examining the *S. auriculata* complex (*S. auriculata* Aubl., *S. molesta*, *S. herzogii* de la Sota, and *S. biloba* Raddi) (Bennett 1966, Forno and Bourne 1984). Several recent studies have examined macroinvertebrates associated with *Salvinia* from a conservation standpoint within its native range (Herrera *et al.* 2000, Albertoni and Palma-Silva 2006, Poi de Neiff and Neiff 2006). Studies sampling insect diversity associated with *Salvinia* species have returned results ranging from 10 insect species (with *S. biloba*; Forno and Bourne 1984) to 113 insect species (with *S. molesta*; Pelli and Barbosa 1998).

No investigations have been carried out to document diversity of invertebrates associated with either *S. minima* or *S. molesta* in the United States. Pelli and Barbosa (1998) suggested that a rich fauna associated with *Salvinia* in Brazil is possibly a side effect of a rich endemic aquatic fauna that uses *Salvinia* incidentally. Unfortunately, while the habitat is commonly found in the southeastern United States, few studies that compared invertebrates from swamps and flooded woodlands to other wetland types (Batzer and Wissinger 1996). Even fewer studies are available from Louisiana to provide baseline surveys for non-impacted communities (Ziser 1978, Sklar 1983, 1985).

MATERIALS AND METHODS

This survey was conducted from May – November during 2009 and 2010 on a privately owned tract of land just north of Gramercy, Louisiana (30°09'48" N, 90°48'38" W) bordered by Interstate 10 and US-61. This site is classified as a cypress-tupelo-blackgum freshwater swamp, and the landscape is dominated by baldcypress (*Taxodium distichum* L.). Common salvinia (*Salvinia minima* Baker) has colonized the open water and formed solid dense mats of plant material. Other invasive aquatic plants encountered in smaller patches at the study site included water hyacinth (*Eichhornia crassipes* (Martius) Solms) and pennywort (*Hydrocotyle* spp.).

One hundred aquatic pitfall traps were built and used to sample insects (see Parys and Johnson 2011 for trap design). Each trap's location was marked with neon plastic flagging tied to the 2 m landscape stake used to anchor the trap. Traps were deployed from 18 May 2009 – 02 November 2009 and again the following year from 07 May 2010 – 08 November 2010. The traps were serviced biweekly for a total of 13 sampling periods each year. Catches were labeled with the trap location and service date, and preserved in the lab in ethylene glycol until processed. Specimens were sorted in the lab and all adult insects except Diptera and Lepidoptera were pinned or pointed and labeled with full locality information. Plant material, amphibian, and crustacean bycatch were discarded. Residual unidentifiable adult taxa and all immature insects were preserved in 95% ethanol and deposited at Louisiana State Arthropod Museum, Louisiana State University, Baton Rouge, Louisiana (LSAM). All preserved specimens were identified to the lowest taxonomic level feasible, using relevant literature and help from taxonomic specialists (Arnett and Thomas

2000, Arnett *et al.* 2002, Epler 2006, Merritt *et al.* 2008, Epler 2010). Voucher specimens of all species listed in Table 1 are deposited at LSAM. Additional specimens are deposited with: CWOB – the personal collection of Charles W. O'Brien, Green Valley, Arizona (Coleoptera: Curculionidae), MEM – Mississippi Entomological Museum, Mississippi State University, Starkville, MS (Hymenoptera: Formicidae), EMUS – Entomological Museum at Utah State, Logan, Utah (Hymenoptera: Pompilidae), HIC – Hymenoptera Institute Collection, Department of Entomology, University of Kentucky, Lexington, Kentucky (Hymenoptera: Ichneumonidae), FSCA – Florida State Collection of Arthropods, Gainesville, Florida (Hymenoptera: Ichneumonidae), and USNM – National Museum of Natural History, Washington, D.C. (Hymenoptera: Ichneumonidae). As these specimens were not collected in protected geographic areas or exported outside the USA, no permits or licenses were required to collect them.

Results and Discussion

A total of 7,933 adult insects were collected (excluding Diptera and Lepidoptera), representing at least 235 species within 70 families and seven orders (Table 1). Coleoptera were the most species-rich order (169), followed by Hymenoptera (38), Hemiptera (20), Orthoptera (four), Odonata (two), and Psocoptera/Blattaria (one each). Staphylinidae were the most species-rich family (37), followed closely by Carabidae (30), Formicidae (26), and Curculionidae (21). In addition to being the most species-rich order, Coleoptera were also the most abundant order (4355), followed again by Hymenoptera (2355), Hemiptera (1041), Orthoptera (172), Odonata (10), and Psocoptera/Blattaria (one each). The most abundant families were Scirtidae (1244), followed by Carabidae (1212), Ichneumonidae (928), Hydrophilidae (922), and Formicidae (862). The five most abundant species were *Scirtes tibialis* Guérin-Méneville (1101) (Scirtidae), *Apsilops hirtifrons* (Ashmead) (926) (Ichneumonidae), *Enochrus ochraceus* (Melsheimer) (562) (Hydrophilidae), *Hydrometra australis* Say (548) (Hydrometridae), and *Stenocrepis duodecimstriata* (Chevrolat) (470) (Carabidae).

Infrequently collected species (<5 individuals) made up 64.7% of our identified species (151/235) with the majority of those that were rare being singletons (105/152). While singletons made up 44.7% of the richness observed, they only accounted for 1.3% of our total abundance. This situation is commonly observed in arthropod surveys; on average 32% of specimens collected in tropical areas are singletons (Coddington *et al.* 2009). Many hypotheses have been presented in the literature to account for rare species including insufficient sampling efforts, genuinely low populations, edge effects, and tourist species (Novotny and Basset 2000, Coddington *et al.* 2009).

As part of this research we collected three currently undescribed species of Coleoptera (located in the families Staphylinidae, Scirtidae, and Ptiliidae) and one previously undescribed braconid wasp. An unidentified genus (near *Nephanes*) in the family Ptiliidae has been observed from dung and fermenting organic material across the eastern coast of the United States and does not currently match any established name (M. Sörensson, pers. com.). The undescribed staphylinid, which belongs to *Hoplandria (Genosema)*, is known from only one specimen; the other Nearctic species of this subgenus (*H. pulchra* Kraatz) is collected from feces and organic material (J.-S. Park pers. com.). The undescribed species of *Cyphon* (Scirtidae) is conspecific with Epler's (2010) "*C.* sp.2." Its range encompasses much of the Atlantic and Gulf coasts (Tetrault unpublished dissertation 1967, Epler 2010). The braconid wasp was described as *Neothlipsis parysae* Sharkey in conjunction with researchers at the Hymenoptera Institute at the University of Kentucky (Sharkey *et al.* 2011). Other species of note included two new Louisiana state records of Curculionidae (*Bagous hydrillae* O'Brien, [see Center *et al*. 2013] and *Onychylis texanus* Burke), a new state generic record for the family Limnichidae (*Limnichites punctatus* (LeConte)), and a new country record for *Pyramica epinotalis* (Weber) (see Chen *et al.* 2012).

Evaluating β-diversity and comparing our results with other studies associating invertebrates with *Salvinia* species has been difficult due to differences in native fauna between study locations, taxonomic resolution, and sampling strategies. Several of the studies only identified invertebrates to family level (Pelli and Barbosa 1998, Albertoni and Palma-Silva 2006, Mfundisi *et al.* 2008). Junk (1977) identified specimens only to order, and Gopalan and Nair (1975) only identified invertebrates to class. Of the papers that provide taxonomic resolution, Bennett (1966) and Forno and Bourne (1984) both focus solely on herbivorous insects, eliminating some of the larger taxonomic groups we sampled.

Several other *Salvinia* invertebrate association studies also report Coleoptera as their most species-rich and/or abundant group (Pelli and Barbosa 1998, Herrera *et al.* 2000, Poi de Neiff and Neiff 2006). Coleoptera represent one of the largest "aquatic" groups in the world (Jäch and Balke 2008). Both Mfundisi *et al.* (2008) and Albertoni and Palma-Silva (2006) reported larval Chironomidae as the most abundant macroinvertebrates, but we did not collect these due to our sampling design. Differences in taxa collected across these studies are almost certainly a result of differences in sampling method (Meyer *et al.* 2011). Our sampling effort for associated insects was much more intensive (2600 samples over two years) than other published studies and focused solely on adult insects.

Sklar's (1983) unpublished dissertation provided one of two inventories available for macroinvertebrates associated with floating vegetation in Louisiana (*Lemna* species, prior to *Salvinia* invasion). His list contains 48 taxa of insects (mostly identified to genus, though some to the species level). Ziser (1978) evaluated wetlands adjacent to our field site and collected 55 taxa of insects (mostly larvae and nymphs). Our study shows much higher levels of richness than Sklar's (1983, 1985) or Ziser's (1978) works.

While Pelli and Barbosa's (1998) hypothesis that invertebrates that already exist in a habitat will use invasive vegetation incidentally would account for some increase in richness and abundance, we would expect values to be similar to other studies in similar habitats. We observed over triple the number of taxa documented in Sklar (1983) or Ziser (1978), including many predaceous

terrestrial Coleoptera and parasitic Hymenoptera. Either these groups are collected preferentially by a floating pitfall trap as opposed to removing whole plant samples, or the mat of *S. minima* may be supporting a community of arthropods exploring a formerly unavailable habitat.

To examine these ideas more closely, we consulted relevant literature for taxa collected during our study (Arnett and Thomas 2000, Arnett *et al.* 2002, Epler 2006, Jäch and Balke 2008, Epler 2010). Habitat associations and lifestyles for the taxa for which information was available are presented in Table 1. For the Coleoptera, Jäch (1998) defined six ecological groups based on familial associations with water: True Water Beetles (1), False Water Beetles (2), Phytophilous Water Beetles (3), Parasitic Water Beetles (4), Facultative Water Beetles (5), and Shore Beetles (6). These classifications are roughly associated with the amount of time spent in contact with the water and presented in the habitat column of Table 1 as "A1-6." Out of the 169 species of Coleoptera we collected, 89 were listed as hygrophilic or riparian in one of the references (Jäch 1998, Arnett and Thomas 2000, Arnett *et al.* 2002). Intriguingly, many of them were also noted as being crepuscular or nocturnal which could also explain their absence from lists created from other (diurnal-only) collection methods. Most of the Hemiptera collected were aquatic in nature or known to feed on aquatic plants (Epler 2006). While many parasitic Hymenoptera are semi-aquatic in nature, we refrained from indicating habitat associations in our taxa list without genus- or species-level identifications. The exception is *Anoplius depressipes* Banks which is known to hunt the semi-aquatic spiders of the genus *Dolomedes* (Roble 1985). A number of the listed species are hypogenic and are likely exploiting previously unavailable habitats (Parys and Johnson 2012).

Despite gaps in our knowledge of the identity and natural history of some of our sampled taxa, we conclude that most taxa collected in our study are either hydro- or hygrophilous through examination of relevant literature. This suggested that most species that occured in the list were already present in the broader habitat prior to invasion by *S. minima* and are likely using the mat to exploit new, adjacent microhabitats. Utilizing new collection methods resulted in different taxa collected than expected (Meyer *et al.* 2011) and the use of a long term non-destructive collection method produced crepuscular and nocturnal insects that are not collected by traditional collecting methods.

Table 1. Insects collected from a mat of *Salvinia minima* (excluding Diptera and Lepidoptera) between 15 May and 02 November 2009, and between 07 May and 08 November 2010. Lifestyle/food associations are as follows: D= detritus, F= fungus, C= carnivorous/predaceous, H= herbivorous, and P= Parasitic. Habitat associations are as follows: T=terrestrial, A= aquatic. Habitat associations for Coleoptera follow Jäch (1998), representing a range of 6 ecological affiliations with water: A1 (completely aquatic) - A6 (riparian). Voucher refers to a representative specimen deposited at LSAM, the number presented is the LSAM specimen number.

ORDER/FAMILY	GENUS/SPECIES	2009	2010	TOTAL	FOOD	HABITAT	VOUCHER
BLATTARIA							
Blattidae	*Blattella germanica* (Linnaeus)	1	1	2	D	T	250451
COLEOPTERA							
Aderidae	*Ganascus ventricosus* (LeConte)	--	1	1	--	T	244784
Anthicidae	*Sapintus pubescens* (Laferté-Sénectère)	27	31	58	C/D	A6	244749
Buprestidae	*Buprestis rufipes* (Olivier)	--	1	1	H	T	251614
Cantharidae	*Malthodes* sp.	--	1	1	C	T	251615
Carabidae	*Agonum (Olisares) moerens* Dejean	107	1	108	C	A5	244182
	Ardistomis obliquata Putzeys	1	1	2	C	A6	251619
	Ardistomis schaumii LeConte	9	--	9	C	A6	251617
	Badister reflexus LeConte	1	--	1	C	A6	251626
	Bembidion (Furcacampa) affine Say	3	--	3	C	A5	251627
	Bembidion (Notaphus) sp.	1	--	1	C	A5	251630
	Bradycellus (Stenocellus) sp.	1	--	1	C	A6	251631
	Calleida viridipennis (Say)	1	--	1	C	T	251632
	Chlaenius (Agostenus) niger Randall	96	1	97	C	A5	251676
	Chlaenius (Chlaeniellus) circumcinctus Say	1	--	1	C	A5	251674
	Chlaenius (Chlaeniellus) impunctifrons Say	2	--	2	C	A5	251675
	Chlaenius (Chlaeniellus) oxygonus Chaudoir	1	--	1	C	A5	251673
	Chlaenius (s. str.) erythropus Say	1	--	1	C	A5	251672
	Chlaenius (s. str.) laticollis Say	28	--	28	C	A5	244370
	Clivina (Leucocara) americana Dejean	1	--	1	C	A5	251634
	Clivina (Semiclivina) dentipes Dejean	1	--	1	C	A5	251633
	Diplocheila major (LeConte)	6	--	6	C	A6	251688
	Elaphropus sp.	13	2	15	C	A5	251635
	Loxandrus sp.1	1	--	1	C	A6	251646
	Loxandrus sp.2	1	--	1	C	A6	251647
	Loxandrus sp.3	1	--	1	C	A6	251648
	Oodes amaroides Dejean	93	--	93	C	A6	247747
	Oodes americanus Dejean	268	10	278	C	A6	247843
	Philodes rectangulus (Chaudoir)	1	--	1	C	A6	251616

TABLE 1. ***CONTINUED.***

ORDER/FAMILY	GENUS/SPECIES	2009	2010	TOTAL	FOOD	HABITAT	VOUCHER
	Pterostichus (Melanius) ebeninus (Dejean)	61	2	63	C	A6	244419
	Scarites quadriceps Chaudoir	1	--	1	C	A6	251662
	Scarites subterraneus Fabricius	1	--	1	C	A6	251663
	Stenocrepis duodecimstriata (Chevrolat)	468	2	470	C	A6	248654
	Stenolophus ochropezus (Say)	3	1	4	H	A6	251664
	Tachys (Paratachys) sp.	16	2	18	C	A6	251654
Cerambycidae	*Elaphidion mucronatum* (Say)	1	--	1	H	T	254613
	Parandra polita Say	1	--	1	H	T	254612
	Styloleptus biustus (LeConte)	1	--	1	H	T	254614
Chrysomelidae	*Chaetocnema* sp.	1	--	1	H	T	254616
	Colaspis sp.	2	--	2	H	A3	254619
	Epitrix sp.	1	--	1	H	T	254615
	Myochrous sp.	1	--	1	H	T	254617
	Nesaecrepida infuscata (Schaeffer)	1	--	1	H	T	254620
	Pseudolampis guttata (LeConte)	7	--	7	H	A3	254624
Ciidae	*Cis* sp.	--	1	1	F	T	244785
Cleridae	*Ababa tantilla* LeConte	1	--	1	C	T	254861
Coccinellidae	*Diomus terminatus* (Say)	2	4	6	C	T	254626
Corylophidae	*Clypastraea* sp.	2	--	2	F	T	254628
	Orthoperus sp.	2	2	4	F	T	254630
Curculionidae	*Ambrosiodmus* sp.	--	1	1	H	T	244791
	Bagous hydrillae O'Brien	2	--	2	H	A3	251678
	Bagous obliquus LeConte	1	1	2	H	A3	251679
	Coccotrypes distinctus (Motschulsky)	3	--	3	H	T	254657
	Cyrtobagous salviniae Calder and Sands	3	--	3	H	A3	251683
	Elleschus ephippiatus (Say)	--	1	1	H	T	251681
	Euplatypus compositus (Say)	1	--	1	H	T	254653
	Hypothenemus sp.	2	4	6	H	T	244794
	Lissorhoptrus simplex (Say)	--	1	1	H	A3	251682
	Neochetina bruchi Hustache	12	--	12	H	A3	254640
	Neochetina eichhorniae Warner	6	2	8	H	A3	254636
	Onychylis nigrirostris (Boheman)	1	3	4	H	A3	251687
	Onychylis texanus Burke	2	--	2	H	A3	251686
	Stenopelmus rufinasus Gyllenhal	76	19	95	H	A3	251319
	Tanysphyrus lemnae (Fabricius)	45	44	89	H	A3	251397
	Xyleborinus saxeseni (Ratzeburg)	--	1	1	H	T	244790
	Xyleborus affinis Eichhoff	18	--	18	H	T	254674
	Xyleborus ferrugineus (Fabricius)	3	--	3	H	T	254672
	Xylosandrus crassiusculus (Motschulsky)	2	--	2	H	T	254660
	Xylosandrus sp.	5	--	5	H	T	254648
Dytiscidae	*Prodaticus bimarginatus* (Say)	2	1	3	C	A1	254692
	Thermonectus sp.	14	2	16	C	A1	254684
Elateridae	*Conoderus suturalis* (LeConte)	--	2	2	C	T	244779
Endomychidae	*Rhymbomicrus* sp.	1	--	1	F	T	254696
Erotylidae	*Ischyrus quadripunctatus* (Olivier)	--	1	1	F	T	254698
	Triplax flavicollis Lacordaire	1	--	1	F	T	254697
	Tritoma angulata Say	--	1	1	F	T	244786
Eucinetidae	*Eucinetus morio* LeConte	4	--	4	F	T	254695
Eucnemidae	*Dirrhagofarsus lewisi* (Fleutiaux)	1	1	2	F	T	254699
Haliplidae	*Peltodytes* sp.	1	--	1	C	A1	254701
Heteroceridae	*Heterocerus mollinus* Kiesenwetter	1	--	1	D	A6	254706
	Heterocerus texanus (Pacheco)	1	--	1	D	A6	254702
	Tropicus sp.	1	--	1	D	A6	254884
Histeridae	*Euspilotus assimilis* (Paykull)	1	--	1	D	A6	254703
Hydraenidae	*Hydraena* sp.	4	--	4	--	A2	254705
Hydrophilidae	*Cercyon praetextatus* (Say)	14	31	45	D	A6	247516
	Cercyon sp.	1	--	1	D	A6	247526
	Derallus altus (LeConte)	--	4	4	D	A1	246376
	Enochrus consors (LeConte)	--	3	3	D	A1	247493

TABLE 1. ***CONTINUED.***

ORDER/FAMILY	GENUS/SPECIES	2009	2010	TOTAL	FOOD	HABITAT	VOUCHER
	Enochrus consortus Green	17	50	67	D	A1	247431
	Enochrus interruptus Gundersen	4	7	11	D	A1	247414
	Enochrus ochraceus (Melsheimer)	520	42	562	D	A1	246698
	Hydrobiomorpha casta (Say)	33	1	34	D	A1	247391
	Hydrochus callosus LeConte	1	--	1	D	A1	247378
	Paracymus sp.	12	21	33	D	A1	247498
	Phaenonotum exstriatum (Say)	141	12	153	D	A1	247314
	Tropisternus blatchleyi d'Orchymont	5	6	11	D	A1	247365
	Tropisternus collaris (Fabricius)	--	1	1	D	A1	247364
Laemophloeidae	*Placonotus* sp.	1	--	1	F	T	254740
Latridiidae	*Corticarina* sp.	1	6	7	F	T	254779
	Enicmus sp.	1	28	29	F	T	254780
	Melanophthalma sp.	7	1	8	F	T	254745
Limnichidae	*Eulimnichus* sp.	20	--	20	H	A6	254790
	Limnichites punctatus (LeConte)	1	--	1	H	A6	254793
	Limnichoderus sp.	11	1	12	H	A6	254812
Melandryidae	*Dircaea liturata* (LeConte)	1	--	1	F	T	254814
	Microscapha clavicornis (LeConte)	3	--	3	F	T	254817
Mordellidae	*Mordellistena andreae* LeConte	3	4	7	H	T	254821
Nitidulidae	*Carpophilus dimidiatus* (Fabricius)	1	--	1	H	T	254827
	Stelidota coenosa Erichson	--	2	2	H	T	254825
	Stelidota geminata (Say)	--	1	1	H	T	244781
	Stelidota octomaculata (Say)	1	--	1	H	T	254824
Noteridae	*Hydrocanthus* sp.	10	5	15	C	A1	254838
	Suphisellus bicolor (Say)	3	1	4	C	A1	254843
Phalacridae	*Stilbus* sp.	1	--	1	F	T	254847
Ptiliidae	*Smicrus americanus* Casey	2	1	3	--	A6	254849
	Unidentified genus (near *Nephanes*) sp.	1	--	1	--	A6	254848
Ptilodactylidae	*Ptilodactyla* sp.	1	--	1	D	A2	254851
Ptinidae	*Byrrhodes* sp.	2	1	3	F	T	251610
	Tricorynus spp.	--	1	1	H	T	251613
Scarabaeidae	*Dyscinetus morator* (Fabricius)	61	9	70	H	A5	249820
	Euphoria sepulcralis (Fabricius)	1	--	1	H	T	254852
	Onthophagus sp.	--	2	2	D	T	254853
Scirtidae	*Cyphon* sp.	138	5	143	D	A2	249940
	Scirtes tibialis Guérin-Méneville	658	443	1101	D	A2	244804
Sphindidae	*Sphindus* sp.	1	--	1	F	T	254855
Staphylinidae	*Acylophorus* sp.	12	22	34	C	A6	251735
	Adinopsis sp.	6	--	6	C	A6	251777
	Aleocharinae gen. sp.	5	3	8	--	--	251785
	Anaquedius sp.	5	1	6	C	A6	244138
	Anotylus sp.	7	3	10	C	A6	244128
	Atanygnathus sp.	1	--	1	C	A6	251693
	Athetini gen. sp.	1	--	1	--	--	251716
	Baeocera sp.	3	1	4	F	T	251713
	Bibloplectus sp.	1	--	1	C	T	244124
	Carpelimus sp.	155	15	170	C	A6	251487
	Coproporus sp.	2	1	3	C	T	251709
	Euaesthetus sp.	10	9	19	C	A6	241299
	Euconnus (Psomophora) sp.	10	--	10	C	T	244161
	Euconnus (s. str.) sp.	1	--	1	C	T	244169
	Gabrius sp.	--	1	1	C	--	251715
	Homaeotarsus sp.	1	--	1	C	A6	244126
	Hoplandria sp.	--	1	1	C	--	251783
	Hoplandria (*Genosema) pulchra* Kraatz	10	--	10	C	T	251791
	Hoplandria (Genosema) sp.	1	--	1	C	T	251784
	Lathrobium sp.	--	1	1	C	--	251763
	Lobrathium sp.	--	1	1	C	--	251756
	Myllaena sp.	25	2	27	C	A6	251799

Table 1. ***Continued.***

ORDER/FAMILY	GENUS/SPECIES	2009	2010	TOTAL	FOOD	HABITAT	VOUCHER
	Neobisnius sp.	3	--	3	C	A6	244139
	Phanerota sp.	--	1	1	--	--	251768
	Philonthus sp.	3	2	5	C	A6	251690
	Pinophilus sp.	1	--	1	C	T	244123
	Pselaphinae gen. sp.	--	1	1	C	--	244125
	Scopaeus sp.	6	3	9	C	A6	244118
	Scydmaeninae gen. sp.	4	1	5	C	T	244165
	Sepedophilus sp.	--	1	1	--	--	251764
	Staphylininae gen. sp.	1	--	1	C	--	251692
	Stenus sp.	14	13	27	C	A6	251698
	Tachinus sp.	1	--	1	C	T	251711
	Tachyporus sp.	1	--	1	C	A6	251708
	Thinobius sp.	1	--	1	C	A6	251717
	Thoracophorus sp.	1	--	1	C	T	244116
	Toxidium sp.	--	1	1	F	--	251773
Tenebrionidae	*Haplandrus ater* (LeConte)	--	1	1	--	--	244778
	Lobopoda sp.	1	--	1	F/H	T	254856
	Platydema sp.	1	--	1	F	T	254859
	Rhipidandrus paradoxus (Palisot de Beauvois)	1	--	1	F	--	254858
	Tribolium sp.	1	--	1	--	--	254857
Tetratomidae	*Eustrophopsis bicolor* (Fabricius)	1	--	1	F	T	254860
Throscidae	*Trixagus horni* Blanchard	1	--	1	F	T	254862
Zopheridae	*Endeitoma granulata* (Say)	--	1	1	F	T	254863
HEMIPTERA							
Anthocoridae	Anthocoridae gen. sp.	1	--	1	C	T	254734
Belostomatidae	*Belostoma lutarium* (Stål)	24	39	63	C	A	250036
	Belostoma testaceum (Leidy)	5	6	11	C	A	250097
	Lethocerus uhleri (Montandon)	1	3	4	C	A	250105
Cercopidae	Cercopidae gen. sp.	1	--	1	H	T	254882
Cicadellidae	*Draeculacephala* sp.	58	18	76	H	T	250109
Delphacidae	Delphacidae gen. sp.	7	1	8	H	T	254877
Gelastocoridae	*Gelastocoris oculatus* (Fabricius)	1	--	1	C	A	254733
Gerridae	*Gerris* sp.	--	1	1	C	A	254869
	Limnoporus canaliculatus (Say)	1	21	22	C	A	254723
Hebridae	*Hebrus consolidus* Uhler	134	24	158	C	A	250296
	Merragata brunnea Drake	--	1	1	C	A	250637
Hydrometridae	*Hydrometra australis* Say	248	300	548	C	A	248128
	Hydrometra hungerfordi Torre-Bueno	4	5	9	C	A	254708
Mesoveliidae	*Mesovelia mulsanti* White	26	1	27	C	A	250571
Naucoridae	*Pelocoris femoratus* (Palisot de Beauvois)	43	3	46	C	A	250193
Nepidae	*Curicta scorpio* Stål	6	6	12	C	A	250636
Saldidae	*Micracanthia husseyi* Drake and Chapman	27	3	30	C	A	250611
	Salda lugubris (Say)	--	4	4	C	A	250592
Veliidae	*Microvelia* sp.	1	17	18	C	A	250673
HYMENOPTERA							
Braconidae	*Acrophasmus* sp.	1	--	1	P	--	244799
	Doryctinae gen. sp.	1	--	1	P	--	244796
	Neothlipsis parysae Sharkey	102	5	107	P	--	230039
	Spathius sp.	1	--	1	P	--	244797
Chalcidoidea	Chalcidoidea gen. sp.	365	52	417	P	--	254890
Formicidae	*Aphenogaster* sp.	1	--	1	C	T	244678
	Camponotus (Colobopsis) sp.	--	1	1	C	T	244724
	Camponotus (Colobopsis) impressus (Roger)	1	--	1	C	T	244699
	Camponotus (s. str.) pennsylvanicus (DeGeer)	19	--	19	C	T	244451
	Crematogaster sp.	83	57	140	C	T	244677
	Crematogaster ashmeadi Mayr	12	--	12	C	T	244511
	Crematogaster cerasi Fitch	29	3	32	C	T	244478
	Crematogaster obscurata Emery	--	2	2	C	T	244500
	Crematogaster vermiculata Emery	188	93	281	C	T	251027

TABLE 1. ***CONTINUED.***

ORDER/FAMILY	GENUS/SPECIES	2009	2010	TOTAL	FOOD	HABITAT	VOUCHER
	Cyphomyrmex rimosus (Spinola)	1	--	1	C	T	244566
	Hypoponera opaciceps (Mayr)	3	--	3	C	T	244568
	Hypoponera opacior (Forel)	19	1	20	C	T	244588
	Pheidole sp.	13	20	33	C	T	244597
	Pheidole dentata (Mayr)	36	1	37	C	T	244636
	Pheidole floridana Emery	--	1	1	C	T	244687
	Pheidole metallescens Emery	3	--	3	C	T	244625
	Pheidole moerens Wheeler	56	3	59	C	T	244525
	Pseudomyrmex ejectus Smith	3	4	7	C	T	244563
	Pseudomyrmex gracilis (Fabricius)	--	2	2	C	T	254887
	Pyramica epinotalis (Weber)	1	--	1	C	T	244684
	Solenopsis carolinensis Forel	1	--	1	C	T	254894
	Solenopsis invicta Buren	134	42	176	C	T	250765
	Solenopsis picta Emery	13	8	21	C	T	254900
	Strumigenys louisianae Roger	2	--	2	C	T	244569
	Strumigenys silvestrii Emery	1	2	3	C	T	244683
	Temnothorax schaumii (Roger)	--	3	3	C	T	244667
Ichneumonidae	*Apsilops hirtifrons* (Ashmead)	926	9	935	P	--	245808
	Ichneumonidae gen. sp.1	1	--	1	P	--	244798
	Ichneumonidae gen. sp.2	1	--	1	P	--	254604
Platygastridae	*Baeus* sp.	1	--	1	P	--	250562
Pompilidae	*Anoplius depressipes* Banks	23	3	26	C	A	250550
Sphecidae	*Sceliphron caementarium* (Drury)	1	--	1	C	T	254889
Vespidae	*Polistes* sp.	--	1	1	C	T	254888
ODONATA							
Coenagrionidae	Coenagrionidae gen. sp.	7	--	7	C	A	250686
Libellulidae	Libellulidae gen. sp.	2	1	3	C	A	250693
ORTHOPTERA							
Gryllidae	*Acheta* sp.	2	--	2	H	T	250450
	Gryllodes sp.	10	--	10	H	T	250457
Tetrigidae	*Tettigidea armata* Morse	109	17	126	H	T	250477
	Tettigidea lateralis (Say)	33	1	34	H	T	250380
PSOCOPTERA							
	Psocoptera gen. sp.	1	--	1	F	T	254885
TOTAL		**6224**	**1709**	**7933**			

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